What is claimed is:

1. A radio equipment enabling radio communication by performing frequency conversion corresponding to signals of different frequency bands, and including a local oscillator signal generator comprising:

a first signal generator generating a first signal having a first frequency;

a second signal generator having a second frequency divider to which a feedback signal is input, a second phase comparator comparing a phase of output signal of the second frequency divider with a phase of a second reference input signal having a predetermined frequency, a second filter filtering output signal of the second phase comparator, and a second voltage controlled oscillator which generates a second signal having a second frequency lower than the first frequency based on output signal of the second filter, and feedbacks the second signal to the second frequency divider as the feedback signal; and

a frequency synthesizer synthesizing the first signal with the second signal, generating a local oscillator signal either having a frequency derived from adding the second frequency to the first frequency, or having a frequency derived from subtracting the second frequency from the first frequency,

wherein the radio equipment uses the local oscillator signal generated by the frequency synthesizer for frequency conversion in the radio communication.

2. The radio equipment according to claim 1,

wherein the first frequency of the first signal generated by the first signal generator is a constant frequency, the second frequency divider in the second signal generator can set a variable frequency division number, and the second frequency of the second signal generated by the second signal generator is variable corresponding to the frequency division number.

3. The radio equipment according to either claim 1 or 2,

wherein the second frequency divider is an integer divider having a positive integer value of a frequency division number.

4. The radio equipment according to any one of claim 1 to 3,

wherein at least the second frequency divider and the second phase comparator among the second signal generator are formed in a single integrated circuit.

5. The radio equipment according to any one of claim 1 to 4,

wherein the first signal generator comprises:

a first frequency divider to which a feedback signal is input;

a first phase comparator comparing a phase of output signal of the first frequency divider with a phase of a first reference input signal having a predetermined frequency;

a first filter filtering output signal of the first phase comparator; and

a first voltage controlled oscillator which generates the first signal having the first frequency based on output signal of the first filter, and feedbacks the first signal to the first frequency divider as the feedback signal.

6. The radio equipment according to claim 5,

wherein the first voltage controlled oscillator and the second voltage controlled oscillator are formed in a single integrated circuit.

7. The radio equipment according to either claim 5 or 6,

wherein the first frequency divider is an integer divider having a positive integer value of a frequency division number.

8. The radio equipment according to any one of claim 5 to 7,

wherein at least the first frequency divider and the first phase comparator among the first signal generator are formed in a single integrated circuit.

9. The radio equipment according to any one of claim 1 to 8,

wherein the frequency synthesizer comprises:

a first phase shifter shifting the phase of the first signal, and generating a third signal having a phase relatively advanced by $\pi/2$ and a fourth signal having a phase relatively delayed by $\pi/2$;

a second phase shifter shifting the phase of the second signal, and generating a fifth signal having a phase relatively advanced by $\pi/2$ and a sixth signal having a phase relatively delayed by $\pi/2$;

an inverter/non-inverter inverting the positive or negative sign of the fifth signal when generating the local oscillator signal having a frequency derived from adding the second frequency to the first frequency, or not inverting the positive or negative sign of the fifth signal when generating the local oscillator signal having a frequency derived from subtracting the second frequency from the first frequency;

a first multiplier multiplying the third signal by the fifth signal passed through the inverter/non-inverter;

a second multiplier multiplying the fourth signal by the sixth signal; and

an adder adding output signal of the first multiplier and output signal of the second multiplier.

10. The radio equipment according to claim 9,

wherein the first phase shifter comprises a phase shifter generating the third signal by advancing the phase of the first signal by $\pi/4$, and a phase shifter generating the fourth signal by delaying the phase of the first signal by $\pi/4$.

11. The radio equipment according to either claim 9 or 10

wherein the second phase shifter comprises a phase shifter generating the fifth signal by advancing the phase of the second signal by $\pi/4$, and a phase shifter generating the sixth signal by delaying the phase of the second signal by $\pi/4$.

12. The radio equipment according to claim 9,

wherein the first phase shifter comprises a phase shifter generating the third signal by advancing the phase of the first signal by $\pi/2$, and generates the fourth signal without shifting the phase of the first signal.

13. The radio equipment according to either claim 9 or 12,

wherein the second phase shifter comprises a phase shifter generating the fifth signal by advancing the phase of the second signal by $\pi/2$, and generates the sixth signal without shifting the phase of the second signal.

14. The radio equipment according to any one of claim 1 to 13,

wherein the convergence time of the second signal generated by the second signal generator is no longer than one-thousandth (1/1,000) sec.

15. Radio equipment enabling radio communication by performing frequency conversion corresponding to signals of different frequency bands, and including a local oscillator signal generator comprising:

a first signal generator having a first frequency divider to which a feedback signal is input, a first phase comparator comparing a phase of output signal of the first frequency divider with a phase of a first reference input signal having a predetermined frequency, a first filter filtering output signal of the first phase comparator, and a first voltage controlled oscillator which generates a first signal having a first frequency based on output signal of the first filter, and feedbacks the first signal to the first frequency divider as the feedback signal;

a second signal generator having a second frequency divider to which a feedback signal is input, a second phase comparator comparing a phase of output signal phase of the second frequency divider with a phase of a second reference input signal having a predetermined frequency, a second filter filtering output signal of the second phase

comparator, and a second voltage controlled oscillator which generates a second signal having a second frequency different from the first frequency based on output signal of the second filter, and feedbacks the second signal to the second frequency divider as the feedback signal; and

a frequency synthesizer synthesizing the first signal with the second signal, and generating a local oscillator signal either having a frequency derived from adding the first frequency to the second frequency, or having a frequency derived from subtracting the smaller frequency between the first frequency and the second frequency, from the larger frequency therebetween,

wherein the radio equipment uses the local oscillator signal generated by the frequency synthesizer for frequency conversion in the radio communication.

16. A local oscillator signal generation method for generating a local oscillator signal for use in frequency conversion in radio equipment enabling radio communication by performing frequency conversion corresponding to signals on different frequency bands, comprising:

generating a first signal having a first frequency;

generating a second signal having a second frequency lower than the first frequency, by use of a phase lock loop which includes a voltage controlled oscillator, a frequency divider to which a feedback signal is input from the voltage controlled oscillator, a phase comparator comparing a phase

of output signal of the frequency divider with a phase of a reference input signal having a predetermined frequency, and a filter filtering output signal of the phase comparator and feeding the output signal to the voltage controlled oscillator; and

synthesizing the first signal with the second signal, and generating the local oscillator signal either having a frequency derived from adding the second frequency to the first frequency, or having a frequency derived from subtracting the second frequency from the first frequency.

17. A local oscillator signal generation method for generating a local oscillator signal for use in frequency conversion in radio equipment enabling radio communication by performing frequency conversion corresponding to signals of different frequency bands, comprising:

generating a first signal having a first frequency by use of a phase lock loop which includes a first voltage controlled oscillator, a first frequency divider to which a feedback signal is input from the first voltage controlled oscillator, a first phase comparator comparing a phase of output signal of the first frequency divider with the phase of a first reference input signal having a predetermined frequency, and a filter filtering output signal of the first phase comparator and feeding the output signal to the first voltage controlled oscillator;

generating a second signal having a second frequency

different from the first frequency, by use of a phase lock loop which includes a second voltage controlled oscillator, a second frequency divider to which a feedback signal is input from the second voltage controlled oscillator, a second phase comparator comparing a phase of output signal of the second frequency divider with a phase of a second reference input signal having a predetermined frequency, and a filter filtering output signal of the second phase comparator and feeding the output signal to the second voltage controlled oscillator; and

synthesizing the first signal with the second signal, and generating the local oscillator signal either having a frequency derived from adding the second frequency to the first frequency, or having a frequency derived from subtracting the smaller frequency between the first frequency and the second frequency, from the larger frequency therebetween.

18. A radio equipment generating a signal of a first frequency band by frequency-converting using a signal of a third frequency band, and generating a signal of a second frequency band by frequency-converting using a signal of a fourth frequency band, thereby enabling transmitting whichever signals of the first frequency band and the second frequency band to other radio equipment, said radio equipment comprising:

a first output section outputting a signal of a

predetermined frequency belonging to a band lying between the third frequency band and the fourth frequency band;

a second output section outputting a signal of a predetermined frequency; and

a generation and output section generating and outputting, using the signals from the first output section and the second output section, a signal having a frequency equal to the frequency sum of the signals from the first and second output sections, or a signal having a frequency equal to the frequency difference between the signals from the first and the second output sections, respectively as the signal of the third frequency band and the signal of the fourth frequency band.

19. A radio equipment converting a signal frequency of a first frequency band using a signal of a third frequency band, and converting a signal frequency of a second frequency band using a signal of a fourth frequency band, thereby enabling reception of whichever signals of the first frequency band and the second frequency band transmitted from other radio equipment, said radio equipment comprising:

a first output section outputting a signal of a predetermined frequency belonging to a band lying between the third frequency band and the fourth frequency band;

a second output section outputting a signal of a predetermined frequency; and

a generation and output section generating and outputting, using the signals from the first output section and the second output section, a signal having a frequency equal to the frequency sum of the signals from the first and second output sections, or a signal having a frequency equal to the frequency difference between the signals from the first and the second output sections, respectively as the signal of the third frequency band and the signal of the fourth frequency band.